

What PQView Can Do For You

Mike Burns
Director of Sales
Electrotek Concepts

- PQView History
- PQView System Overview
 - Data Collection
 - Software Foundation
- PQView User Interface
 - Dashboards & Reporting Tools
 - Power Quality Analysis Tools
- PQView Applications and Case Studies
 - FaultPoint
 - Failure Prediction

Electrotek Concepts



Corporate Strength

- Part of Gossen Metrowatt family of companies focused on test and measurement solutions worldwide
- Shared expertise with Dranetz Technologies, a leader in power quality instrumentation for over 50 years

Expertise

- Software and power quality professionals with 100+ years of experience
- Power quality monitoring, analysis, reporting, and automatic fault location.
- PQView has 100+ installed instances and 3000+ registered users

Industry Leader

- Longstanding partnership with EPRI to develop power quality focused solutions
- Product development influenced by collaboration with utility advisory partners
- Annual Users Group Meeting

Electrotek/PQView History



- Founded In Mountain View California in 1984
- PQView 1 developed with EPRI - 1994
- PQView 2 expanded capabilities - 1997
- PQView 3 Commercial Software - 2000
- PQView 4 Utility/EPRI collaboration – 2017
- New Improvements/Modules every 3 months
- We have >1 million MH of development over 28 years.

Customers

US Customers

(partial list)



Customers Outside of the US

(partial list)



What is PQView - Data Sources



Data Sources

Powerful Data Concentrator

Collects **complex datasets** associated with PQ data

Manages data collection from a wide variety of **industry standard data sources:**

- Intelligent power measurement devices
- Software systems and databases
- File-based power quality data sources

PQView System

Power quality expert software system

Developed in **collaboration with PQ experts** from EPRI® and a global network of utility partners

Conforms with IT infrastructure, tools and best practices to ensure **data integrity and security**

User Interface

Convert Data into Information

User friendly **dashboards**

Compliance and event **reporting tools**

Extensive collection of analysis tools:

- Data & Event Logs
- RMS Variations
- Waveform Analysis

Applications include:

- FaultPoint
- Failure prediction

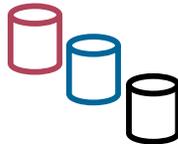
Data Source Library



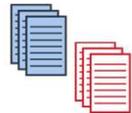
Data Sources



Intelligent Devices
Meters, Relays, RTUs
PQ Analyzer, Fault Recorder



Database or System
Scada, OMS, DMS, MDMS,
AMR, Historian, Weather



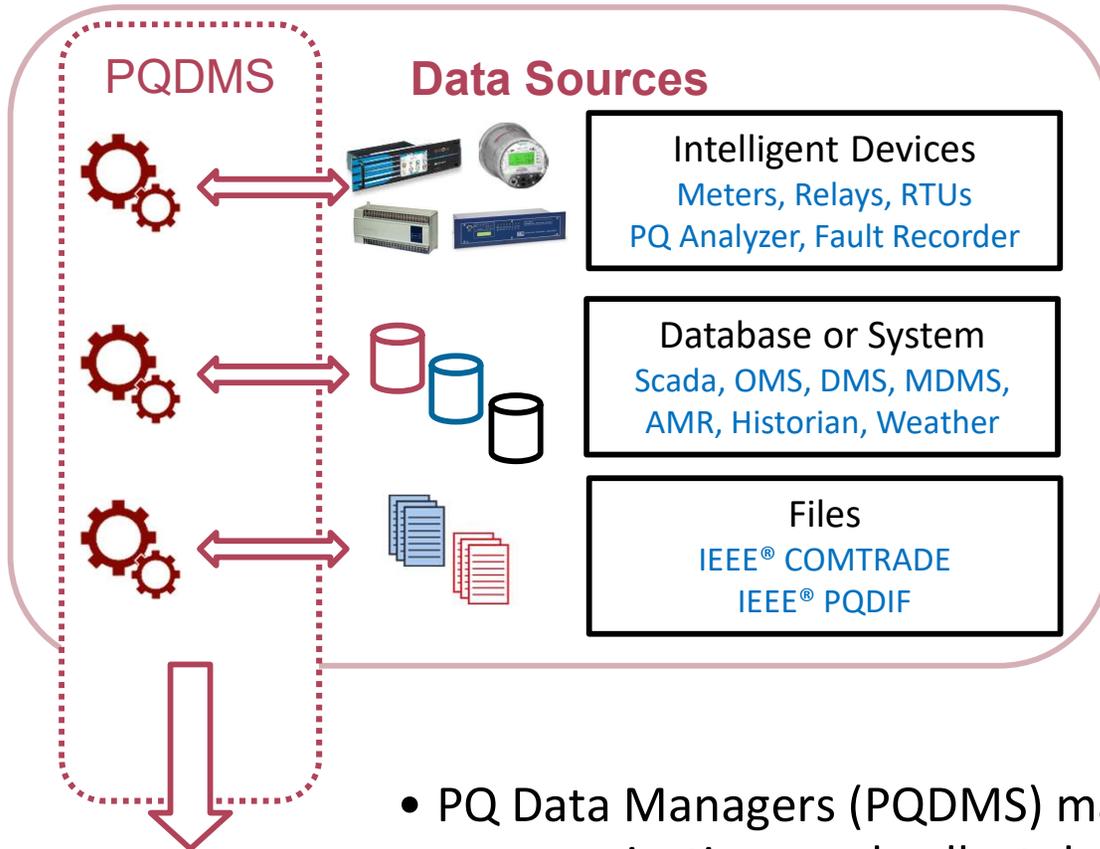
Files
IEEE® COMTRADE
IEEE® PQDIF

- Collect complex PQ data from intelligent electronic devices, databases and industry standard file formats
- Manufacturer neutral approach allows simultaneous connection to a library of devices and systems regardless of brand

Library of supported manufacturers, devices and systems

- IEEE® PQDIF
- IEEE® COMTRADE
- MODBUS®
- Advantech®
- Arbiter® Systems
- AMETEK Jemstar
- BTECH
- Camille Bauer®
- Cooper® CYMDIST
- Dranetz®
- EDM I
- ElectroIndustries®
- Eaton Power Xpert
- GE
- Gossen Metrawatt
- HIOKI Hi-View Pro Text File
- I-Grid®
- Iskra® Mavolog Pro
- Power Monitors
- PSL PQube®
- Qualitrol® /LEM
- SATEC
- Schneider Electric® ION Protocol
- Schweitzer Engineering Laboratories®
- SATEC PAS Database
- Schneider Electric® Database
- Siemens®
- Synergi Electric
- TECTRA ALFA
- Unipower®

PQView PQDMS = Data Handlers



- Configuration services
- Customer data handlers
- PQDMS Maintenance
- Customer Support

- PQ Data Managers (PQDMS) manage communications and collect data from various sources and store the data in the PQView Database

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Compliance and event **reporting tools**

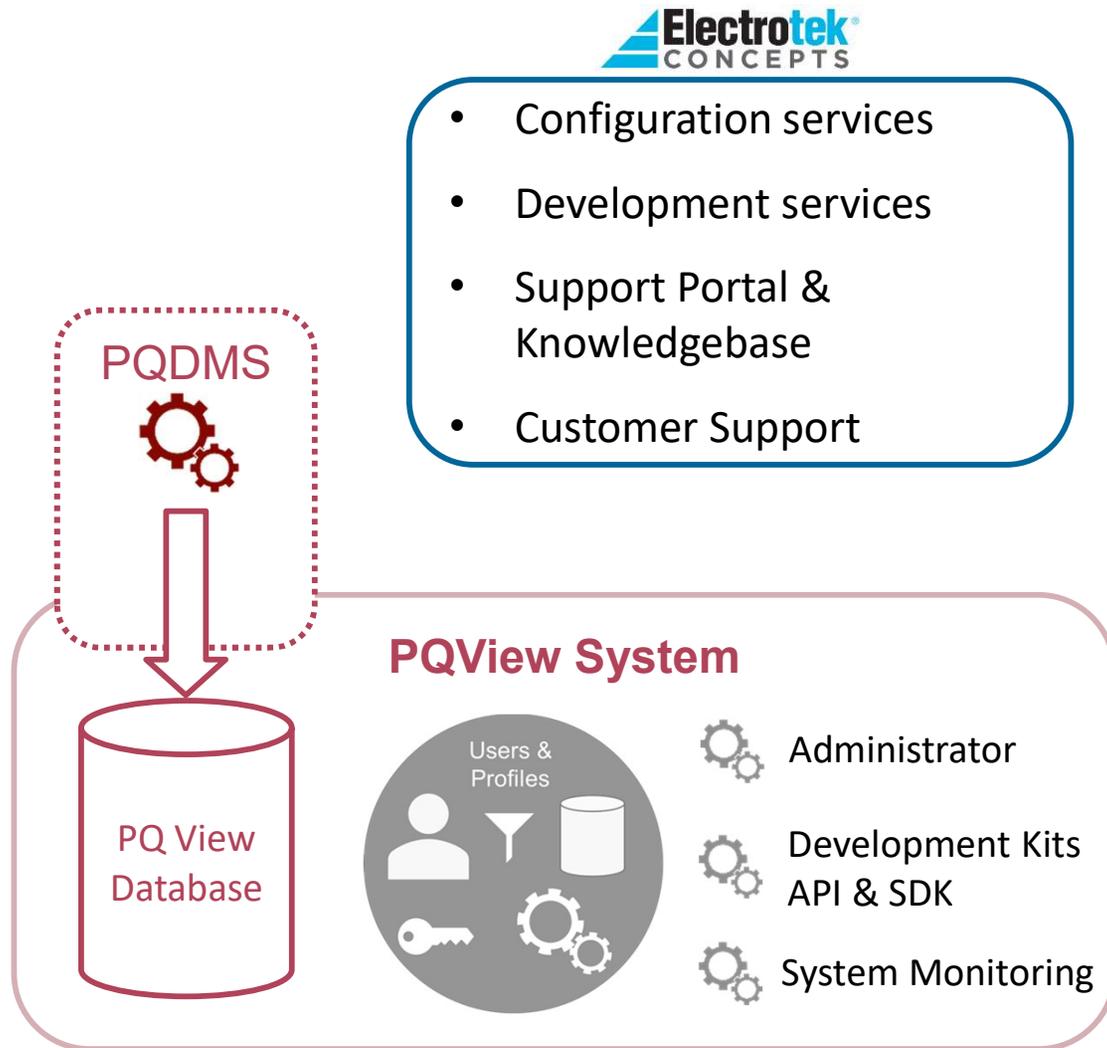
Extensive collection of analysis tools:

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- Waveform Analysis

Applications include:

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- Failure prediction

PQView Software Foundation



- PQ View Database
 - SQL Server or Express
 - Data management
- Administrator
 - Configure system settings
 - Configure data collection
 - Manage database settings
 - Manage user profiles, preferences and permissions
- Development Kits to build additional information system interfaces
- Monitor device connections to ensure reliable data collection

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User Interface – Dashboards



Browser: PQWeb 4 | URL: pqweb4.electrotek.com

Navigation: Home | Views | Real-Time | Admin | Help | admin

Start Polling | 1 Database Selected

Events

Site Name	Date and Time	Type
● Knoxville 61000 Delta	2017-01-26 10:49:03	Transient
● Knoxville 61000 WYE	2017-01-26 09:54:41	Transient
● Knoxville 61000 Delta	2017-01-26 09:54:41	Transient
● Knoxville 61000 Delta	2017-01-26 07:57:38	Transient
● Knoxville 61000 WYE	2017-01-25 16:00:08	Transient
● Knoxville 61000 WYE	2017-01-24 16:04:21	Transient
● Knoxville 61000 WYE	2017-01-23 11:36:23	Transient
● Knoxville 61000 Delta	2017-01-23 11:36:23	Transient

Knoxville 61000 WYE - 1/26/2017 09:54:41.5630

Electrotek/EPRI | PQView DEMO

Monitors

Name	Status	Health
ArbiterDemo1	Inactive	Unknown
Beverly 61000	Idle	Normal
Knoxville 61000 Delta	Idle	Normal
Knoxville 61000 Wye	Idle	Normal
Knoxville ES210	Idle	Normal
Knoxville ES230	Idle	Normal

Browser: KML Map | URL: pqweb4.electrotek.com/Views/KMLMap

Navigation: Home | Views | Real-Time | Admin | Help | admin

KML Map

Demo Substation - 200511267062532-1 | Submit

Polling Interval: 30 | Start Polling

Knoxville 61000 Delta

4 items selected

Channel	Value
Rms Voltage AB	205.37
Rms Voltage BC	205.581
Rms Voltage CA	205.818
Apparent Power Total	471.02

Knoxville 61000 Wye

6 items selected

Channel	Value
Rms Voltage A	120.295
Rms Voltage B	120.428
Rms Voltage C	120.03
Rms Current A	1.90331
Rms Current B	1.27305
Rms Current C	1.32009

Knoxville ES210

7 items selected

Channel	Value
Active Power Total	2972.1
Apparent Power A	1559.85
Apparent Power B	1443.38
Apparent Power C	1555.96
True Power Factor A	0.568
True Power Factor B	0.6516
True Power Factor C	0.5766



User Interface – Event Logs



PQWeb® 4 Home Views Real-Time Admin Help 1 Database Selected

Event Report List

Event List Options

Select Sites: Sites

Select Date Range: Last Seven Days with Data

Date Range: 11/27/2016 2:01 PM, 12/04/2016 2:01 PM

Select Report: Default Options

Submit

Filter, sort and aggregate data

Sites, Dates, Event type, Magnitude,

Charts Select A

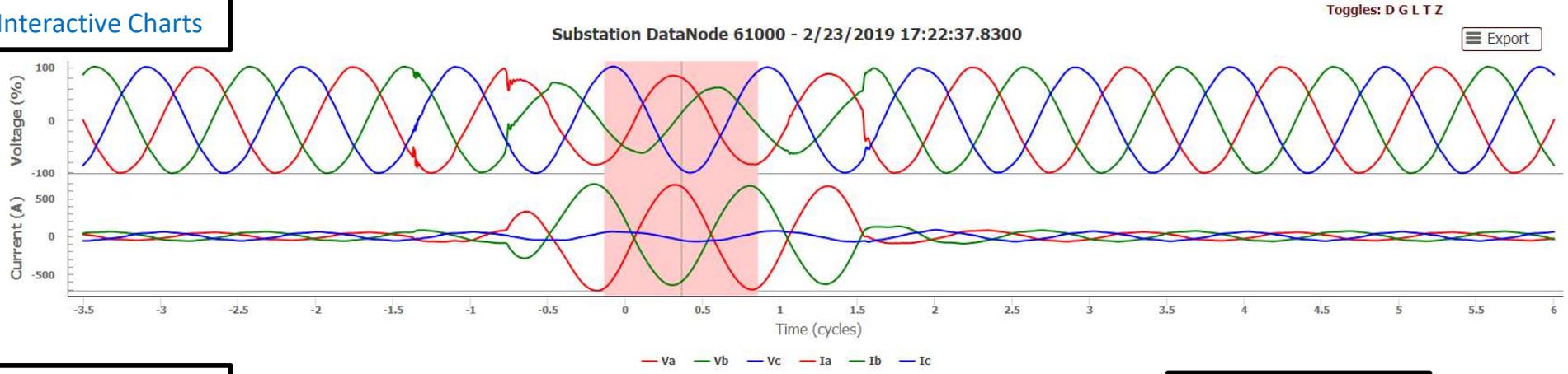
Show 25 entries Search:

Site Name		Date and Time	Type	Minimum	Maximum	
Knoxville 61000 Delta		2016-12-04 09:00:44	Transient	-99.716%	98.949%	<input type="checkbox"/>
Knoxville 61000 Delta		2016-12-02 19:21:46	Transient	-90.221%	89.951%	<input type="checkbox"/>
Knoxville 61000 Delta		2016-12-02 19:21:46	Transient	-93.656%	97.327%	<input type="checkbox"/>
Knoxville 61000 Delta		2016-12-02 19:21:29	RMS Variation	64.251%	99.735%	<input type="checkbox"/>
Knoxville 61000 Delta		2016-12-02 19:21:29	Transient	-91.239%	95.067%	<input type="checkbox"/>
Knoxville 61000 Delta		2016-12-02 17:27:42	Transient	-103.495%	98.564%	<input type="checkbox"/>

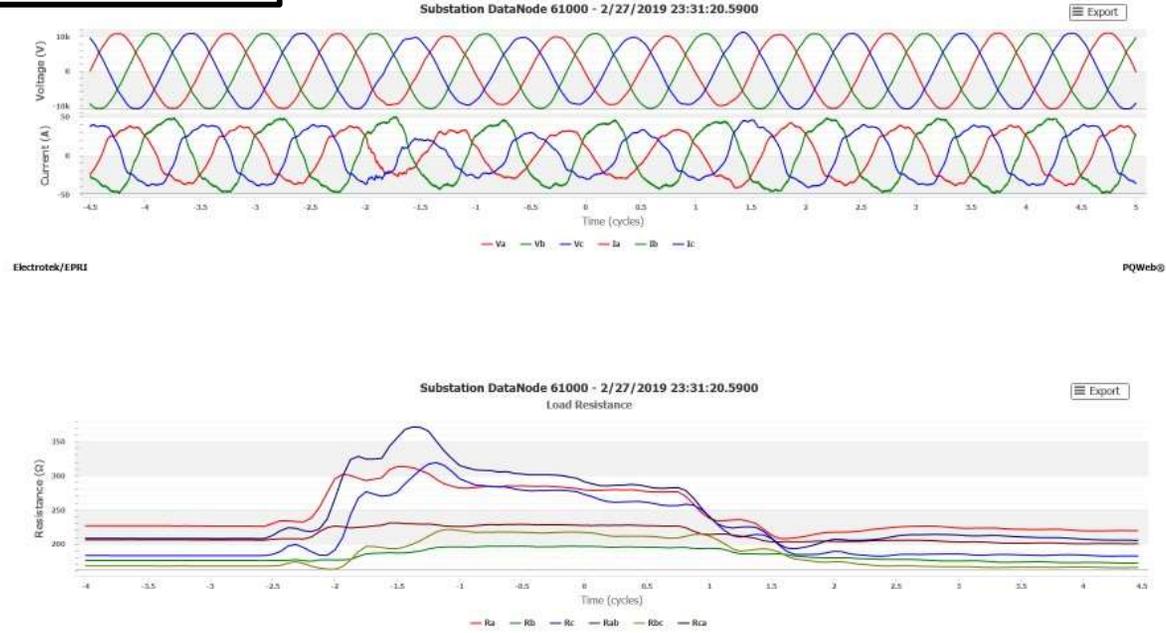
User Interface – Waveform Analysis



Interactive Charts

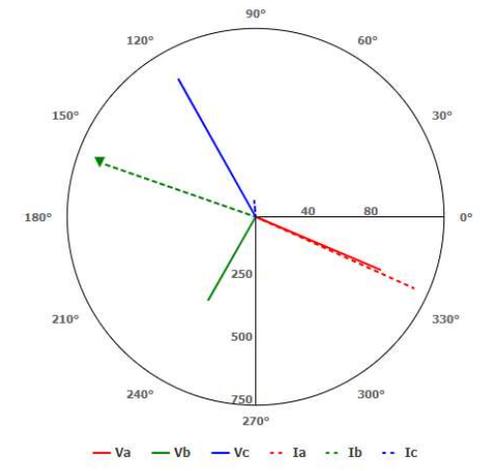


Static Charts



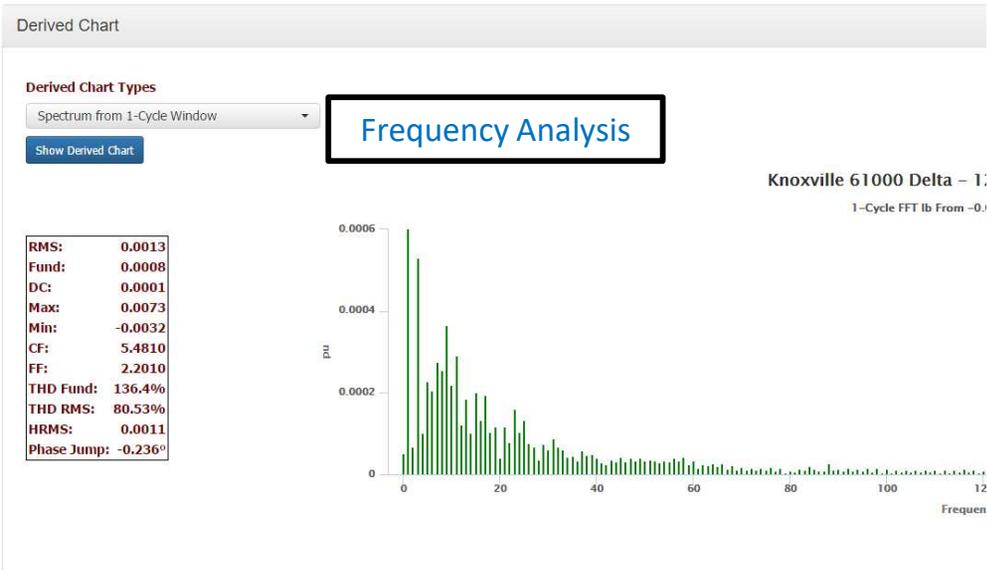
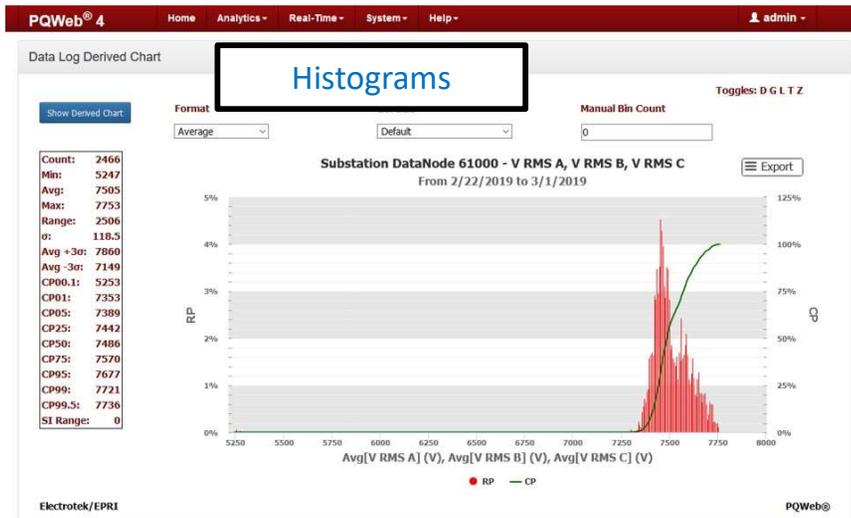
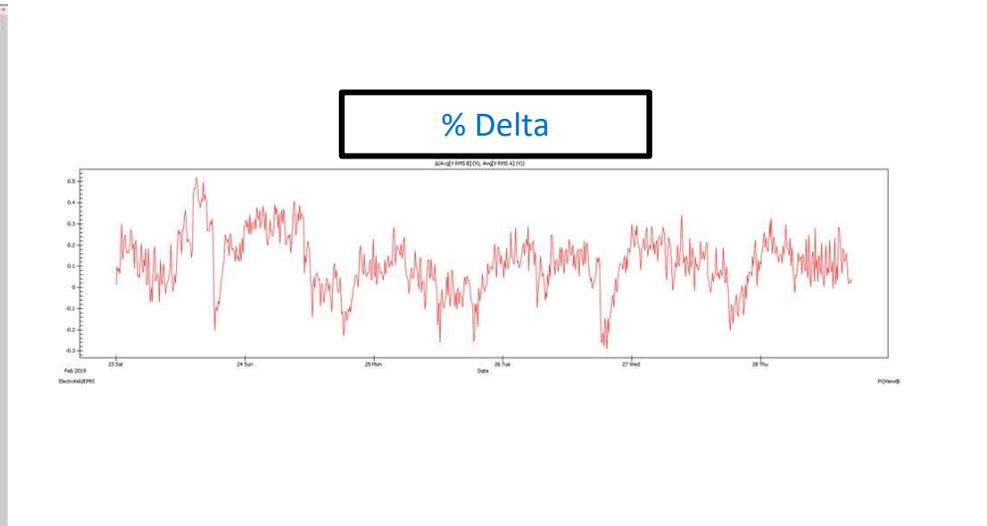
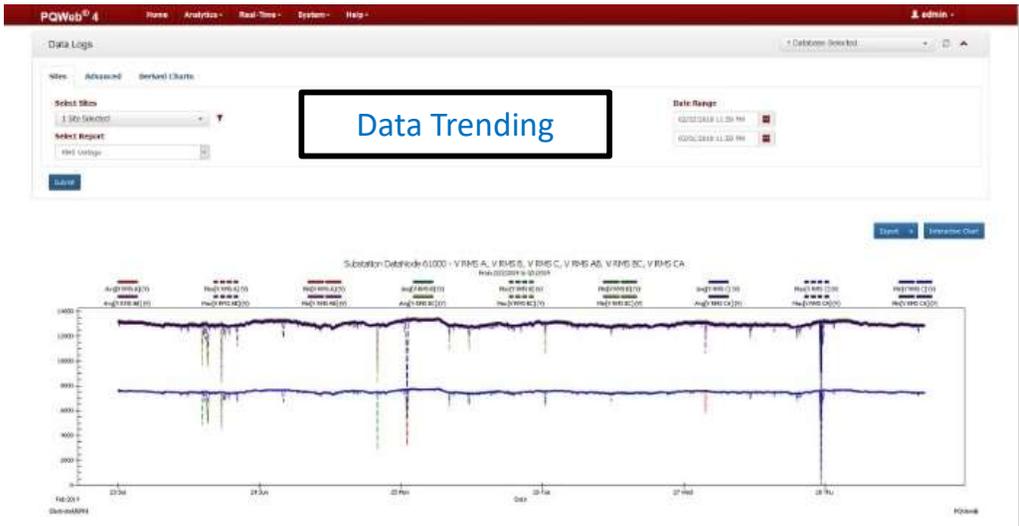
Derived Charts

Substation DataNode 61000 - 2/23/2019 17:22:37.8300
Va From -0.1358 To 0.863 c



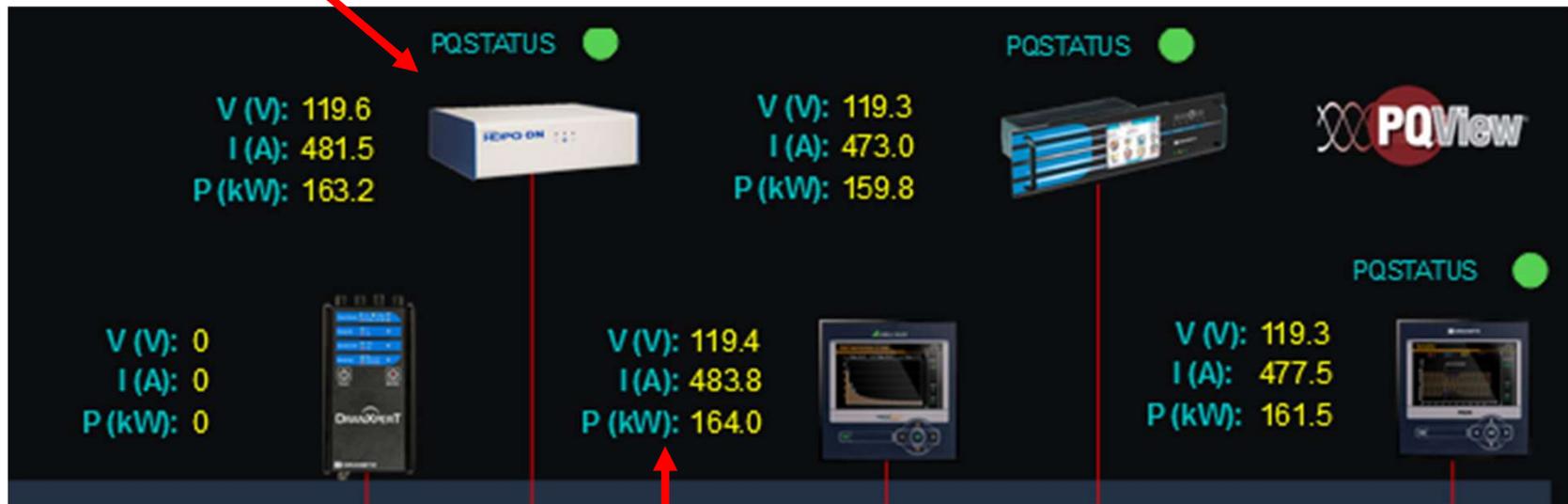
PQWeb®

User Interface – Data Logs



Real Time Dashboard Module

Visual Metering & System Representation



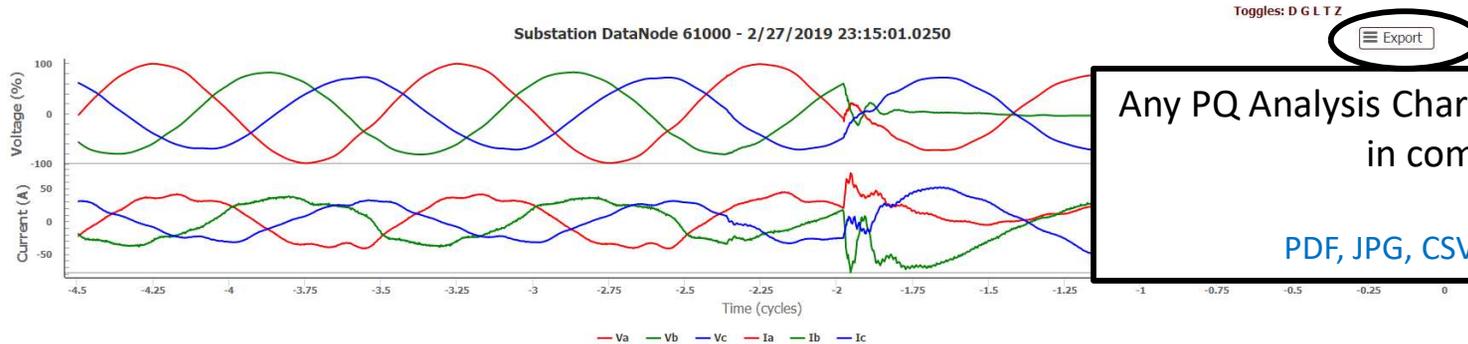
Real Time Metering

Slide 17

RIE1

Ross Ignall - Electrotek, 10/14/2021

User Interface – Reporting Tools



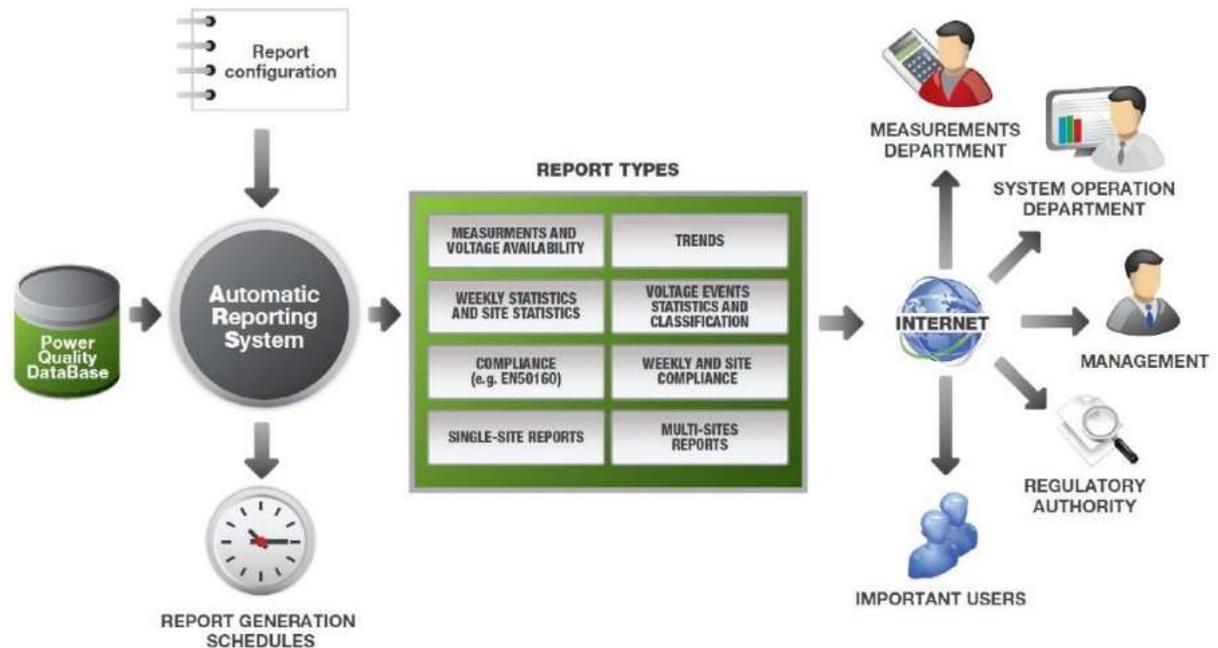
Electrotek/EPRI

PQWeb®

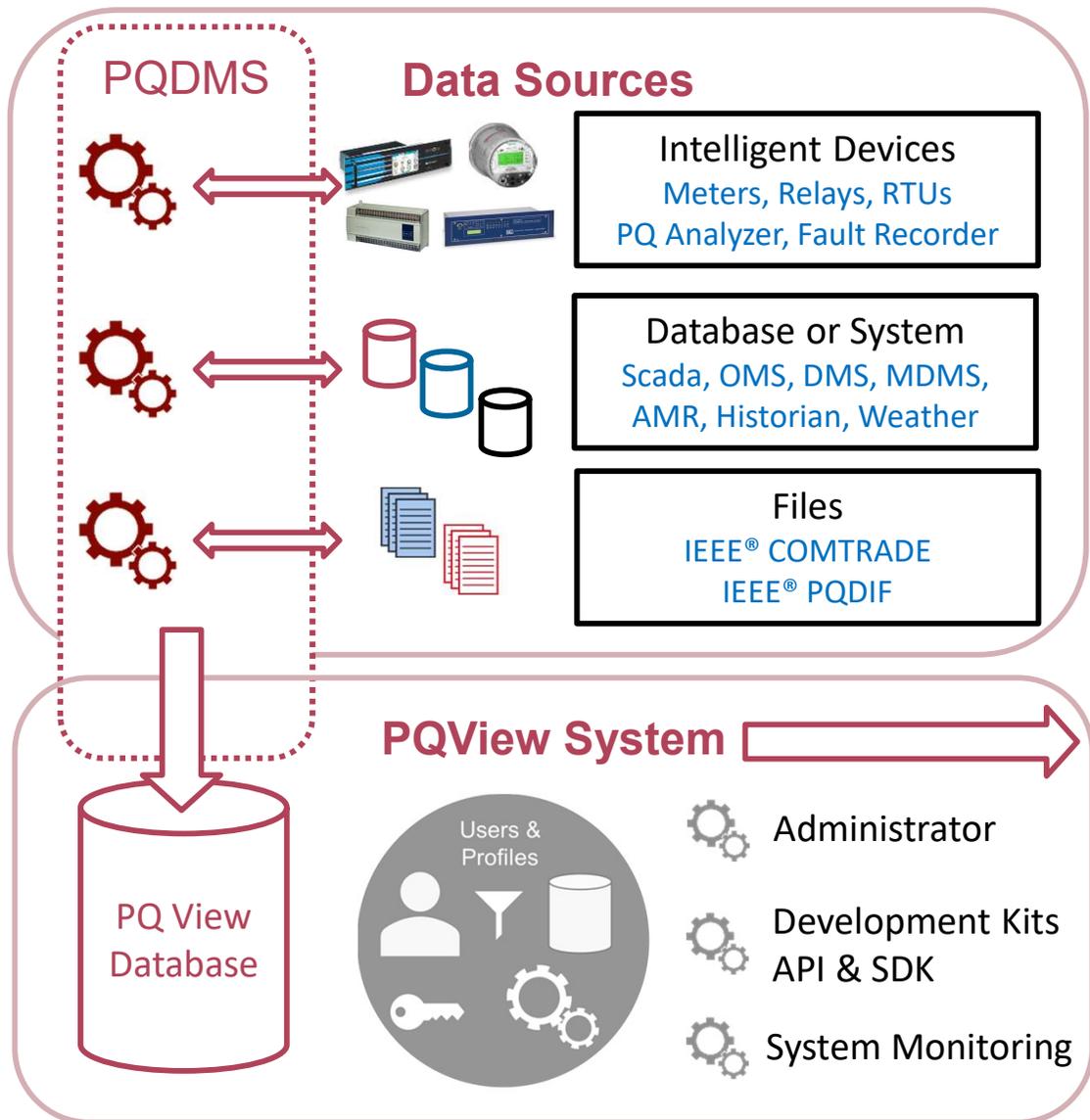
Two Available Reporting Tools

ARS – Scheduled Reporting

PQDR – Compliance Reporting



PQView = Data to Information



User Interface

Convert Data into Information

The user interface displays several key components:

- Events Table:** A table listing events with columns for Date and Time, Type, and Status.
- Waveform Plots:** Multiple plots showing voltage and current waveforms over time, with a red shaded area indicating a fault event.
- Geographic Maps:** Two maps showing the physical location of the substation and the distribution network.
- Monitors Table:** A table with columns for Name, Status, and Health, listing various system components.
- Substation Data Node Plot:** A plot showing voltage and current for a specific substation node, with a legend for Va, Vb, Vc, Ia, Ib, Ic.
- Phasor Diagram:** A circular diagram showing the phase relationships between the three phases (Va, Vb, Vc).

Fault Location Case Study



Challenge

How to locate electrical fault locations accurately so that utility crews may be dispatched quickly and efficiently to identify and repair issues



Approach

- ✓ Collect power quality waveform data from any manufacturer's PQ monitor
- ✓ Apply algorithms to power quality data to categorize fault data and estimate distance to fault
- ✓ Correlate fault data with utility location data and provide operators with fault location information
- ✓ Apply a Second Fault algorithm to predict potential additional faults resulting from the electrical stresses caused by the first fault



Results



Fault Location Map

87 % Accuracy to 3 manholes

66 % Accuracy to 1 manhole

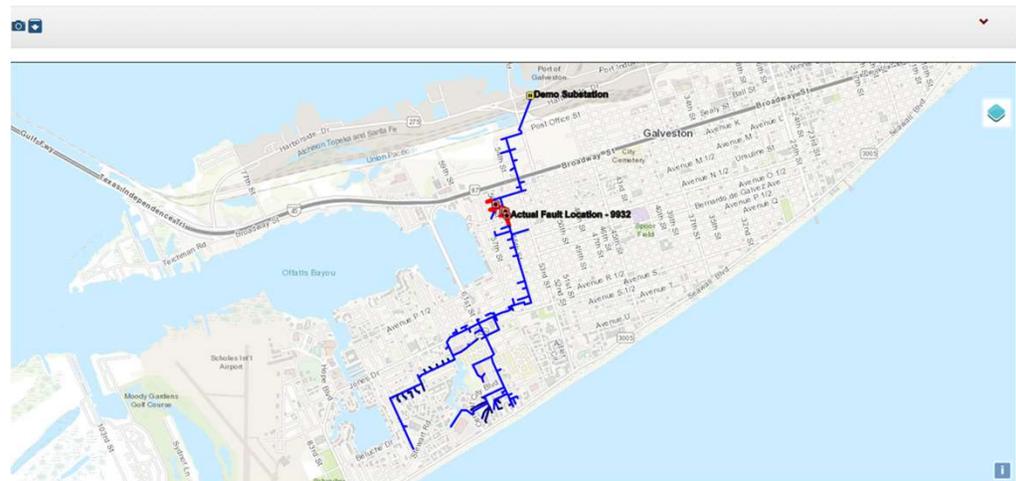
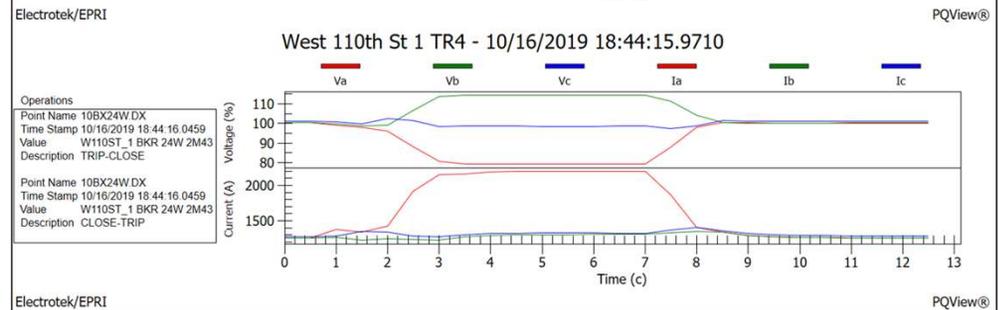
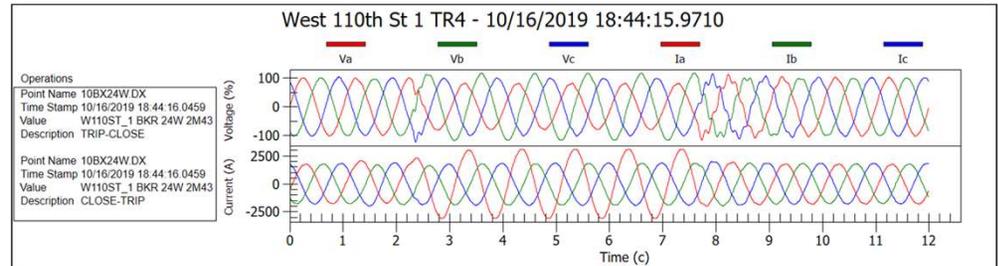
1 hour Time saved per restoration



Video



Technical Details



Failure Prediction Case Study

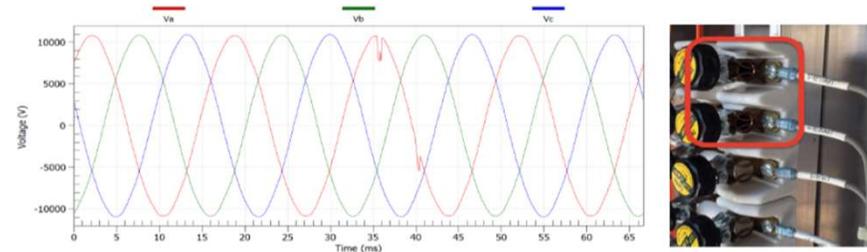


Challenge

Critical electrical equipment can fail without physical warning signs. Traditional time-based maintenance cannot identify and react to failures based on actual operating conditions



Loose Fuse

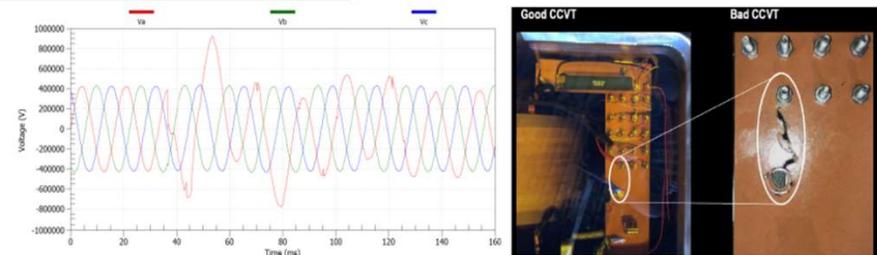


Approach

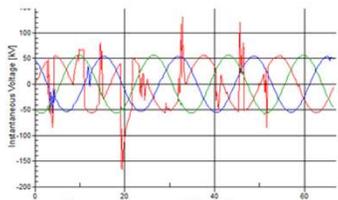


- ✓ Define a baseline of healthy equipment waveform signatures using data from any PQ monitor from any manufacturer
- ✓ Compare healthy and actual signatures to identify potential failures based on operating conditions
- ✓ Alert operations and maintenance teams to take preventative actions before failures occur

Failing CCVT



Results



Equipment Signatures

Improved SAIFI index

Annual avoided outages

Avoided asset replacement cost

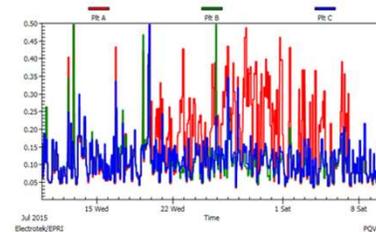


Video



Technical Details

Tap Changer Failing



What's Next for PQView?



Artificial Intelligence
Machine Learning
Fault Prediction



Cloud Based PQView
PQView as a Service



Questions & Discussion

